fraction $\frac{\phi x}{fx}$, where the denominator fx is the product of any number of factors, the same or different of the form $1-x^m$, and upon the expansion by means thereof of the fraction in ascending powers of x. The coefficient of the general term is expressed in terms of circulating functions, such that the sums of certain groups of the coefficients are severally equal to zero; these functions the author calls prime circulators. The investigations show the general form of the analytical expression for the number of partitions, and they also indicate how the values of the coefficients of the prime circulators entering into such expression are to be determined.

II. "Further Researches on the Partition of Numbers." By ARTHUR CAYLEY, Esq., F.R.S. Received April 14, 1855. With Postscript. Received April 20, 1855.

The memoir contains a discussion of the problem "to find in how many ways a number q can be made up as a sum of m terms with the elements 0, 1, 2,.... k, each element being repeatable an indefinite number of times." The number q may without loss of generality be taken to be equal to $\frac{1}{2}(km-\alpha)$, and the expression for the number of partitions of this number $\frac{1}{2}(km-\alpha)$ is by a peculiar method reduced to the form coeff. x^m in $\frac{\phi x}{fx}$, where $\frac{\phi x}{fx}$ is an algebraical fraction, the form of which depends on the value of k, *but which does in anywise involve the number m*; the denominator fx is the product of factors of the form $1-x^\theta$, and up to certain limiting values of α the fraction is a proper fraction. The author remarks in conclusion that the researches were made for the sake of their application to the theory developed in his "Second Memoir upon Quantics."